

MYRCENE

CASRN: 123-35-3

For other data, click on the Table of Contents

Best Sections

Ongoing Test Status :

The following link will take the user to the National Toxicology Program (NTP) Test Agent Search Results page, which tabulates all of the "Standard Toxicology & Carcinogenesis Studies", "Developmental Studies", and "Genetic Toxicity Studies" performed with this chemical. Clicking on the "Testing Status" link will take the user to the status (i.e., in review, in progress, in preparation, on test, completed, etc.) and results of all the studies that the NTP has done on this chemical. [http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm?fuseaction=ntpsearch.searchresults&searchterm=123-35-3]

[Available from: http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm?fuseaction=ntpsearch.searchresults&searchterm=123-35-3 **QC REVIEWED**]

General Manufacturing Information :

Derivatives: geraniol-nerol, mixed; myrcenol; 1-methyl-4-(4-methyl-3-penten-1-yl)-3-cyclohexenecarboxaldehyde; 3/4-(4-methyl-3-penten-1-yl)-3-cyclohexenecarboxaldehyde

[Ashford, R.D. Ashford's Dictionary of Industrial Chemicals. London, England: Wavelength Publications Ltd., 1994., p. 612] **PEER REVIEWED**

Volatilization from Water/Soil :

The Henry's Law constant for myrcene is estimated as 0.0643 atm-cu m/mole(SRC) from its experimental values for vapor pressure, 2.01 mm Hg(1), and water solubility, 5.60 mg/l(2). This Henry's Law constant indicates that myrcene is expected to volatilize rapidly from water surfaces(3). Based on this Henry's Law constant, the volatilization half-life from a model river (1 m deep, flowing 1 m/sec, wind velocity of 3 m/sec)(3) is estimated as 3.43 hrs(SRC). The volatilization half-life from a model lake (1 m deep, flowing 0.05 m/sec, wind velocity of 0.5 m/sec)(3) is estimated as 111 hrs(SRC). However, the volatilization half-life does not take into account the effects of adsorption. This is apparent from the results of two EXAMS model runs, one in which the effect of adsorption was considered, yielding an estimated half-life of 36 days in a model pond 2 m deep, and one in which the effect of adsorption was ignored, yielding an estimated half-life of 40 hrs in a model pond 2 m deep(4). Myrcene's estimated Henry's Law constant indicates that volatilization from moist soil surfaces may occur(SRC). The potential for volatilization of myrcene from dry soil surfaces may exist(SRC) based upon a vapor pressure of 2.01 mm Hg(1).

[(1) Perry RH, Green D; Perry's Chemical Engineer's Handbook. Physical

and Chemical Data. NY, NY: McGraw-Hill 6th ed p. 3-50 (1984) (2) Chem Inspect Test Inst; Biodegradation and Bioaccumulation Data of Existing Chemicals Based on the CSDL Japan; Published by Japan Chemical Industry Ecology-Toxicology and Information Center. ISBN 4-89074-101-1 p. 2-121 (1992) (3) Lyman WJ et al; Handbook of Chemical Property Estimation Methods. Washington, DC: Amer Chem Soc pp. 4-9, 15-1 to 15-29 (1990) (4) USEPA; EXAMS II Computer Simulation (1987)] **PEER REVIEWED**

Plant Concentrations :

Myrcene has been detected in emissions from Norway spruce, fir, Scots pine (*Pinus sylvestris*), and larch trees in the country of Switzerland, concns not specified. Highest emission rates take place during the summer month of July(1). Myrcene has been detected in emissions from Scots Pine at 2.3-6.3% of total terpenes(2). Myrcene has been detected in emissions from Siberian pine, silver fir, common juniper, zeravskar juniper, pencil cedar, evergreen cypress, northern white cedar, Chinese arbor vitae and deciduous moss, concns not specified. These plants are characteristic of northern Europe and Asia(2). Myrcene has been detected in emissions from the oak species *Quercus ilex* L. at Castel Porziano, Rome, Italy on June 1993 at 2.25% of total plant emissions between the hours of 11 a.m. to 1 p.m.(3). Myrcene has been detected in dynamic headspace samples of mushrooms *C. carcharias*, *A. ovoidea*, and *M. rosea* at 0.2, <0.1, and <0.1 percent relative to all identified volatile compounds(4). Through solvent extraction, myrcene was detected at 3 and 2 percent relative to all identified volatile compounds in *G. glutinosus* mushrooms(4). Average emission rate of myrcene for an 18 yr old Norway spruce tree was 3 ug/sq m-h with highest concns at noon and lowest concns at night(5). Myrcene has been detected ranging from 100-1,750 parts per trillion at 13 m height inside the canopy of maple forests in Quebec from July 28-30, 1989(6). Myrcene was detected ranging from 3.1-58 ng/cu m at 1 m above ground Aug 30-Dec 16, 1985 in Kalbelescherer in the Southern Black Forest, Germany. The suspected sources of emission were *Picea abies* and *Abies alba* tree species(7). Myrcene was detected at 0.04% of total volatile constituents in headspace samples of kiwi fruit flowers(8).

[(1) Andreani-Aksoyoglu S et al; J Atmos Chem 20: 71-87 (1995) (2) Isidorov VA et al; Atmos Environ 19: 1-8 (1985) (3) Kesselmeier J et al; Atmos Environ 30: 1841-1850 (1996) (4) Breheret S et al; J Agric Food Chem 45: 831-6 (1997) (5) Bufler U et al; Atmos Environ 25A: 251-6 (1991) (6) Clement B et al; Atmos Environ 9: 2513-6 (1990) (7) Juttner F; Chemosphere 17: 309-17 (1988) (8) Tatsuka K et al; J Agric Food Chem 38: 2176-80 (1990)] **PEER REVIEWED**

Environmental Fate :

AQUATIC FATE: Based on a classification scheme(1), an estimated Koc value of 1300(SRC), determined from a structure estimation method(2), indicates that myrcene is expected to adsorb to suspended solids and sediment in water(SRC). Volatilization from water surfaces is expected(3) based upon an estimated Henry's Law constant of 0.0643 atm-cu m/mole(SRC), developed using a fragment constant estimation method(4). Volatilization half-lives for a model river and model lake are 3.43 and 111 hrs, respectively(SRC), using an estimation method(3). However, the volatilization half-life does not take into account the effects of adsorption. This is apparent from the results of

two EXAMS model runs, one in which the effect of adsorption was considered, yielding an estimated half-life of 36 days in a model pond 2 m deep, and one in which the effect of adsorption was ignored, yielding an estimated half-life of 40 hrs in a model pond 2 m deep(5). Myrcene, present at 100 mg/l, reached 82-92% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/l and the Japanese MITI test suggesting rapid degradation(6). According to a classification scheme(7), an estimated BCF of 324(SRC), from a log Kow(6) and a regression-derived equation(3), suggests the potential for bioconcentration in aquatic organisms is high.

[(1) Swann RL et al; Res Rev 85: 17-28 (1983) (2) Meylan WM et al; Environ Sci Technol 26: 1560-67 (1992) (3) Lyman WJ et al; Handbook of Chemical Property Estimation Methods. Washington, DC: Amer Chem Soc pp. 4-9, 5-4, 5-10, 15-1 to 15-29 (1990) (4) Meylan WM, Howard PH; Environ Toxicol Chem 10: 1283-93 (1991) (5) USEPA; EXAMS II Computer Simulation (1987) (6) Chem Inspect Test Inst; Biodegradation and Bioaccumulation Data of Existing Chemicals Based on the CSDL Japan; Published by Japan Chemical Industry Ecology-Toxicology and Information Center. ISBN 4-89074-101-1 p. 2-121 (1992) (7) Franke C et al; Chemosphere 29: 1501-14 (1994)] **PEER REVIEWED**

Environmental Abiotic Degradation :

The rate constant for the vapor-phase reaction of myrcene with photochemically-produced hydroxyl radicals is 2.15×10^{-10} cu cm/molecule-sec at 25 deg C(1). This corresponds to an atmospheric half-life of about 1.79 hrs(SRC) at an atmospheric concn of 5×10^5 hydroxyl radicals per cu cm(2). The rate constant for the vapor-phase reaction of myrcene with ozone is estimated to be 4.44×10^{-16} cu cm/molecule-sec(3). This corresponds to an atmospheric half-life of about 37 mins at an atmospheric concn of 7×10^{11} mol/cu cm(3). Myrcene is not expected to undergo hydrolysis in the environment due to the lack of hydrolyzable functional groups(4) nor to directly photolyze due to the lack of absorption in the environmental UV spectrum. Myrcene reportedly has a half-life of 1.1 hrs in the presence of nitrate radicals in the ambient atmosphere, respectively(5).

[(1) Atkinson R; Journal of Physical And Chemical Reference Data. Monograph 1 (1989) (2) Atkinson R et al; Atmos Env 24: 2647-54 (1990) (3) Meylan WM, Howard PH; Chemosphere 26: 2293-99 (1993) (4) Lyman WJ et al; Handbook of Chemical Property Estimation Methods. Washington, DC: Amer Chem Soc pp. 7-4, 7-5 (1990) (5) Verschuieren K; Handbook of Environmental Data on Organic Chemicals. 3rd Ed. NY,NY: Van Nostrand Reinhold p. 1345 (1996)] **PEER REVIEWED**

Synonyms :

3-METHYLENE-7-METHYL-1,6-OCTADIENE

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Synonyms :

7-METHYL-3-METHYLENE-1,6-OCTADIENE

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Synonyms :

1,6-OCTADIENE, 7-METHYL-**3**-METHYLENE-

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Environmental Fate/Exposure Summary :

Myrcene's production and use in detergents, perfumes, and flavorings may result in its release to the environment through various waste streams. Myrcene has been detected in water effluent and air emissions from pulp and timber mill processes. Myrcene has been detected as a natural gaseous emission from various plant species and in various fruits and vegetables. If released to air, a vapor pressure of 2.01 mm Hg at 25 deg C indicates myrcene will exist solely in the vapor-phase in the ambient atmosphere. Vapor-phase myrcene will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals, ozone radicals and nitrate; the half-lives for these reactions in air are estimated to be 1.79 hrs, 37 mins, and 1.1 hrs, respectively. If released to soil, myrcene is expected to have low mobility based upon an estimated Koc of 1300. Volatilization from moist soil surfaces is expected to be an important fate process based upon an estimated Henry's Law constant of 0.0643 atm-cu m/mole. Myrcene may potentially volatilize from dry soil surfaces based upon its vapor pressure. However, adsorption to soil is expected to attenuate volatilization. Biodegradation in soil may be an important fate process based upon considerable biodegradation in the Japanese MITI test. If released into water, myrcene is expected to adsorb to suspended solids and sediment in the water column based upon the estimated Koc. Myrcene, present at 100 mg/l, reached 82-92% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/l and the Japanese MITI test. Volatilization from water surfaces is expected to be an important fate process based upon this compound's estimated Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are **3.43** and 111 hrs, respectively. However, volatilization from water surfaces is expected to be attenuated by adsorption to suspended solids and sediment in the water column. An estimated BCF of 324 suggests the potential for bioconcentration in aquatic organisms is high. Hydrolysis is not expected to occur due to the lack of hydrolyzable functional groups. Occupational exposure to myrcene may occur through inhalation and dermal contact with this compound at workplaces where myrcene is produced or used. The general population may be exposed to myrcene via inhalation of ambient air, ingestion of food and drinking water and products containing myrcene. (SRC)

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Artificial Pollution Sources :

Myrcene's production and use as a detergent(1), flavoring(2), and in perfumes(2) may result in its release to the environment through various waste streams(SRC). Myrcene has also been detected in water effluents(**3**) and air emissions(4) from pulp and timber mill processes.

[(1) Otson R et al; pp. 335-421 in Gas Pollut: Charact Cycl, Nriagu, Jo ed., NY,NY: John Wiley & Sons, Inc (1992) (2) Lewis RJ Sr; Hawley's Condensed Chemical Dictionary. 12th Ed. NY,NY: Van Nostrand Reinhold Company p. 802 (1993) (3) Juettner F; Wat Sci Tech 25: 155-64 (1992) (4) Stroemvall AM et al; Environ Pollut 79: 215-18 (1993)] **PEER

REVIEWED**

Environmental Fate :

TERRESTRIAL FATE: Based on a classification scheme(1), an estimated Koc value of 1300(SRC), determined from a structure estimation method(2), indicates that myrcene is expected to have low mobility in soil(SRC). Volatilization of myrcene from moist soil surfaces is expected to be an important fate process(SRC) given an estimated Henry's Law constant of 0.0643 atm-cu m/mole(SRC), using a fragment constant estimation method(3). The potential for volatilization of myrcene from dry soil surfaces may exist(SRC) based upon a vapor pressure of 2.01 mm Hg(4). However, adsorption to soil is expected to attenuate volatilization(SRC). Biodegradation in soil may be an important fate process based upon considerable biodegradation in the Japanese MITI test(5).

[(1) Swann RL et al; Res Rev 85: 17-28 (1983) (2) Meylan WM et al; Environ Sci Technol 26: 1560-67 (1992) (3) Meylan WM, Howard PH; Environ Toxicol Chem 10: 1283-93 (1991) (4) Perry RH, Green D; Perry's Chemical Engineer's Handbook. Physical and Chemical Data. NY, NY: McGraw-Hill 6th Ed p. 3-50 (1984) (5) Chem Inspect Test Inst; Biodegradation and Bioaccumulation Data of Existing Chemicals Based on the CSCL Japan; Published by Japan Chemical Industry Ecology-Toxicology and Information Center. ISBN 4-89074-101-1 p. 2-121 (1992)] **PEER REVIEWED**

Environmental Fate :

ATMOSPHERIC FATE: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere(1), myrcene, which has a vapor pressure of 2.01 mm Hg at 25 deg C(2), is expected to exist solely in the vapor-phase in the ambient atmosphere. Vapor-phase myrcene is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals(SRC); the half-life for this reaction in air is 1.79 hrs(SRC), calculated from its rate constant of 2.15×10^{-10} cu cm/molecule-sec at 25 deg C(3). Vapor-phase myrcene is degraded in the atmosphere by reaction with ozone(SRC); the half-life for this reaction in air is 37 mins(SRC), calculated from its estimated rate constant of 4.44×10^{-16} cu cm/molecule-sec at 25 deg C(4). Myrcene reportedly has a half-life of 1.1 hrs in the presence of nitrate radicals in the ambient atmosphere, respectively(5).

[(1) Bidleman TF; Environ Sci Technol 22: 361-367 (1988) (2) Perry RH, Green D; Perry's Chemical Engineer's Handbook. Physical and Chemical Data. NY, NY: McGraw-Hill 6th ed p. 3-50 (1984) (3) Atkinson R; Journal of Physical And Chemical Reference Data. Monograph 1 (1989) (4) Meylan WM, Howard PH; Chemosphere 26: 2293-99 (1993) (5) Verschueren K; Handbook of Environmental Data on Organic Chemicals. 3rd ed. NY, NY: Van Nostrand Reinhold p. 1345 (1996)] **PEER REVIEWED**

Environmental Bioconcentration :

An estimated BCF of 324 was calculated for myrcene(SRC), using a log Kow of 4.17(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is high.

[(1) Chem Inspect Test Inst; Biodegradation and Bioaccumulation Data of

Existing Chemicals Based on the CSDL Japan; Published by Japan Chemical Industry Ecology-Toxicology & Information Center. ISBN 4-89074-101-1 p. 2-121 (1992) (2) Lyman WJ et al; Handbook of Chemical Property Estimation Methods. Washington,DC: Amer Chem Soc pp. 5-4, 5-10 (1990) (3) Franke C et al; Chemosphere 29: 1501-14 (1994)] **PEER REVIEWED**

Effluent Concentrations :

Myrcene has been detected in Kraft mill waste waters ranging from trace to 160 ppb concns(1). Percent composition of myrcene released to air during Kraft processing of softwood Scots pine ranged from 1-1.6% on Feb 22, 1989(2). Percent composition (ug/cu m) of total concn of myrcene in atmospheric emission plumes from kraft pulp industries, processing Scots pine on June 20, 1989 was 1.2%, 0.9%, and 1.3% at 0 m, 20 m and 40 m heights, respectively(2). Kraft processing plant is located on the Swedish coast, 50 km south of Goteborg(2). Myrcene was detected in the headspace and waste exudate of waste trucks, concns not specified(3). Myrcene was detected in 4 of 4 air samples from biodegradable waste and 2 of 7 air samples from mixed waste containing biodegradable and plastics/printed paper wastes, concns not specified(4). Myrcene was detected in air samples from dry log debarking of Scots pine (*Pinus sylvestris*) and Norway spruce at 1.1 and 2.0%, respectively, of total volatile compounds at a saw-mill plant in Anneberg, Sweden from May 30, 1991 to June 6, 1991(5). Myrcene was detected in air samples from pulp wood dry drum baking and wood chips from Norway spruce at 4.7 and 1.0%, respectively, of total volatile compounds at Bravikus Pappersbuk near Norrkoping, Sweden from March 14, 1990 to June 19, 1990(5).

[(1) Wilson D et al; Pulp Pap Can 76: 91-3 (1975) (2) Stroemvall AM et al; Environ Pollut 79: 215-18 (1993) (3) Wilkins K et al; Chemosphere 32: 2049-2055 (1996) (4) Wilkins K; Chemosphere 29: 47-53 (1994) (5) Stroemvall AM et al; Environ Pollut 79: 215-9 (1993)] **PEER REVIEWED**

Food Survey Values :

Myrcene has been detected as an emission from apricots, carrots, cotton, Valencia oranges, pistachios, walnuts and whitehorn at 0.1, 0.6, 0.4, 0.5, 0.5, 0.2, and 1.9 ug/g respectively(1). Volatiles from fresh guava fruit pulp obtained by vacuum distillation revealed that myrcene is 0.001 ug/g of pineapple guava. Myrcene has been reportedly found in common guava and in strawberry and yellow guava, concns not specified(2). Myrcene comprises 22.41% of volatile hydrocarbons identified in extract of Korean Chamchwi(3). The concn of myrcene in relation to ethyl acetate, defined as 1, in Idaho Russet Burbank potatoes is 0.08(4). Myrcene has been detected in emissions from the roasting of filberts, thick shelled sweet flavored tree nuts, concns not specified(5). Volatile components of mango stored at -15 deg C for 1 year contained 2.7 ug/g, while fresh mangos from Florida contained 1.0 ug/g(6). Concentrated natural orange essence used in orange juice concentrate, contains myrcene, concn not specified(7). Myrcene has been detected in freshly squeezed unpasteurized orange juice at concns ranging from 0.34-4.1 ppm(8). Myrcene is found within clove essential oil ranging from 0.30-0.45% of total volatile compounds(9). Myrcene was detected at 0.51% of total volatile constituents in headspace samples of fresh, tree-ripened nectarines(10).

[(1) Arey J et al; J Geophys Res 96D: 9329-36 (1991) (2) Binder RG et

al; J Agric Food Chem 37: 734-6 (1989) (3) Chung TY et al; J Agric Food Chem 41: 1693-97 (1993) (4) Coleman EC et al; J Agric Food Chem 29: 42-8 (1981) (5) Kinlin TE et al; J Agric Food chem 20: 1021 (1972) (6) Macleod AJ et al; J Agric Food Chem 36: 137-9 (1988) (7) Moshonas MG et al; J Agric Food Chem 38: 2181-4 (1990) (8) Moshonas MG et al; J Agric Food Chem 42: 1525-8 (1994) (9) Muchalal M et al; Agric Biol Chem 49: 1583-9 (1985) (10) Takeoka GR et al; J Agric Food Chem 36: 553-60 (1988)] **PEER REVIEWED**

Probable Routes of Human Exposure :

NIOSH (NOES Survey 1981-1983) has statistically estimated that 1,583 workers (302 of these are female) are potentially exposed to myrcene in the US(1). Occupational exposure to myrcene may occur through inhalation and dermal contact with this compound at workplaces where myrcene is produced or used(SRC). The general population may be exposed to myrcene via inhalation of ambient air in forests and other natural environments containing plants that emit myrcene(2), ingestion of food(3-13) and drinking water(14,15) and other products(16) containing myrcene. Since myrcene is an approved food additive, the greatest potential for exposure lies in the consumption of those foods with myrcene additives(16).

[(1) NIOSH; National Occupational Exposure Survey (NOES) (1983) (2) Riemer DD et al; Chemosphere 28: 837-50 (1994) (3) Arey J et al; J Geophys Res 96D: 9329-36 (1991) (4) Binder RG et al; J Agric Food Chem 37: 734-6 (1989) (5) Chung TY et al; J Agric Food Chem 41: 1693-97 (1993) (6) Coleman EC et al; J Agric Food Chem 29: 42-8 (1981) (7) Kinlin TE et al; J Agric Food chem 20: 1021 (1972) (8) Macleod AJ et al; J Agric Food Chem 36:137-9 (1988) (9) Moshonas MG et al; J Agric Food Chem 38: 2181-4 (1990) (10) Moshonas M G et al; J Agric Food Chem 42: 1525-8 (1994) (11) Muchalal M et al; Agric Biol Chem 49: 1583-9 (1985) (12) Takeoka GR et al; J Agric Food Chem 36: 553-60 (1988) (13) Tatsuka K et al; J Agric Food Chem 38: 2176-80 (1990) (14) Juettner F; Wat Sci Tech 25: 155-64 (1992) (15) Button DK et al; Mar Chem 26: 57-66 (1989) (16) Lewis RJ Sr; Hawley's Condensed Chemical Dictionary. 12th Ed. NY,NY: Van Nostrand Reinhold Company p. 802 (1993)] **PEER REVIEWED**

Emergency Medical Treatment :

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The following Overview, *** GENERAL OR UNKNOWN CHEMICAL ***, is relevant for this HSDB record chemical.

Life Support:

- o This overview assumes that basic life support measures have been instituted.

Clinical Effects:

0.2.1 SUMMARY OF EXPOSURE

0.2.1.1 ACUTE EXPOSURE

- A) A SPECIFIC REVIEW on the clinical effects and treatment of individuals exposed to this agent HAS NOT YET BEEN PREPARED. The following pertains to the GENERAL EVALUATION and TREATMENT of individuals exposed to potentially toxic chemicals.
- B) GENERAL EVALUATION -
 - 1) Exposed individuals should have a careful, thorough medical history and physical examination performed, looking for any abnormalities. Exposure to chemicals with a strong odor often results in such nonspecific symptoms as headache, dizziness, weakness, and nausea.
- C) IRRITATION -
 - 1) Many chemicals cause irritation of the eyes, skin, and respiratory tract. In severe cases respiratory tract irritation can progress to ARDS/acute lung injury, which may be delayed in onset for up to 24 to 72 hours in some cases.
 - 2) Irritation or burns of the esophagus or gastrointestinal tract are also possible if caustic or irritant chemicals are ingested.
- D) HYPERSENSITIVITY -
 - 1) A number of chemical agents produce an allergic hypersensitivity dermatitis or asthma with bronchospasm and wheezing with chronic exposure.

Laboratory:

- A) A number of chemicals produce abnormalities of the hematopoietic system, liver, and kidneys. Monitoring complete blood count, urinalysis, and liver and kidney function tests is suggested for patients with significant exposure.
- B) If respiratory tract irritation or respiratory depression is evident, monitor arterial blood gases, chest x-ray, and pulmonary function tests.

Treatment Overview:

0.4.2 ORAL EXPOSURE

A) GASTRIC LAVAGE

- 1) Significant esophageal or gastrointestinal tract irritation or burns may occur following ingestion. The possible benefit of early removal of some ingested

material by cautious gastric lavage must be weighed against potential complications of bleeding or perforation.

- 2) GASTRIC LAVAGE: Consider after ingestion of a potentially life-threatening amount of poison if it can be performed soon after ingestion (generally within 1 hour). Protect airway by placement in Trendelenburg and left lateral decubitus position or by endotracheal intubation. Control any seizures first.
 - a) CONTRAINDICATIONS: Loss of airway protective reflexes or decreased level of consciousness in unintubated patients; following ingestion of corrosives; hydrocarbons (high aspiration potential); patients at risk of hemorrhage or gastrointestinal perforation; and trivial or non-toxic ingestion.

B) ACTIVATED CHARCOAL

- 1) Activated charcoal binds most toxic agents and can decrease their systemic absorption if administered soon after ingestion. In general, metals and acids are poorly bound and patients ingesting these materials will not likely benefit from activated charcoal administration.
 - a) Activated charcoal should not be given to patients ingesting strong acidic or basic caustic chemicals. Activated charcoal is also of unproven value in patients ingesting irritant chemicals, where it may obscure endoscopic findings when the procedure is justified.
- 2) ACTIVATED CHARCOAL: Administer charcoal as a slurry (240 mL water/30 g charcoal). Usual dose: 25 to 100 g in adults/adolescents, 25 to 50 g in children (1 to 12 years), and 1 g/kg in infants less than 1 year old.

C) DILUTION -

- 1) Immediate dilution with milk or water may be of benefit in caustic or irritant chemical ingestions.
- 2) DILUTION: Immediately dilute with 4 to 8 ounces (120 to 240 mL) of water or milk (not to exceed 4 ounces/120 mL in a child).

D) IRRITATION -

- 1) Observe patients with ingestion carefully for the possible development of esophageal or gastrointestinal tract irritation or burns. If signs or symptoms of esophageal irritation or burns are present, consider endoscopy to determine the extent of injury.

E) OBSERVATION CRITERIA -

- 1) Carefully observe patients with ingestion exposure for the development of any systemic signs or symptoms and administer symptomatic treatment as necessary.
- 2) Patients symptomatic following exposure should be observed in a controlled setting until all signs and symptoms have fully resolved.

0.4.3 INHALATION EXPOSURE

A) DECONTAMINATION -

- 1) INHALATION: Move patient to fresh air. Monitor for respiratory distress. If cough or difficulty breathing develops, evaluate for respiratory tract irritation,

bronchitis, or pneumonitis. Administer oxygen and assist ventilation as required. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids.

B) IRRITATION -

- 1) Respiratory tract irritation, if severe, can progress to pulmonary edema which may be delayed in onset up to 24 to 72 hours after exposure in some cases.

C) ACUTE LUNG INJURY -

- 1) ACUTE LUNG INJURY: Maintain ventilation and oxygenation and evaluate with frequent arterial blood gas or pulse oximetry monitoring. Early use of PEEP and mechanical ventilation may be needed.

D) BRONCHOSPASM -

- 1) If bronchospasm and wheezing occur, consider treatment with inhaled sympathomimetic agents.

E) OBSERVATION CRITERIA -

- 1) Carefully observe patients with inhalation exposure for the development of any systemic signs or symptoms and administer symptomatic treatment as necessary.
- 2) Patients symptomatic following exposure should be observed in a controlled setting until all signs and symptoms have fully resolved.

0.4.4 EYE EXPOSURE

- A) DECONTAMINATION: Irrigate exposed eyes with copious amounts of room temperature water for at least 15 minutes. If irritation, pain, swelling, lacrimation, or photophobia persist, the patient should be seen in a health care facility.

0.4.5 DERMAL EXPOSURE

A) OVERVIEW

1) DERMAL DECONTAMINATION -

- a) DECONTAMINATION: Remove contaminated clothing and wash exposed area thoroughly with soap and water. A physician may need to examine the area if irritation or pain persists.

2) PESTICIDES -

- a) DECONTAMINATION: Remove contaminated clothing and jewelry. Wash the skin, including hair and nails, vigorously; do repeated soap washings. Discard contaminated clothing.

3) IRRITATION -

- a) Treat dermal irritation or burns with standard topical therapy. Patients developing dermal hypersensitivity reactions may require treatment with systemic or topical corticosteroids or antihistamines.

4) DERMAL ABSORPTION -

- a) Some chemicals can produce systemic poisoning by absorption through intact skin. Carefully observe patients with dermal exposure for the development of any systemic signs or symptoms and administer symptomatic treatment as necessary.

Range of Toxicity:

- A) No specific range of toxicity can be established for the broad field of chemicals in general.

[Rumack BH POISINDEX(R) Information System Micromedex, Inc., Englewood, CO, 2011; CCIS Volume 148, edition expires Aug, 2011. Hall AH & Rumack BH (Eds): TOMES(R) Information System Micromedex, Inc., Englewood, CO, 2011; CCIS Volume 148, edition expires Aug, 2011.] **PEER REVIEWED**